

Chiral doublet structure in ^{112}Ru

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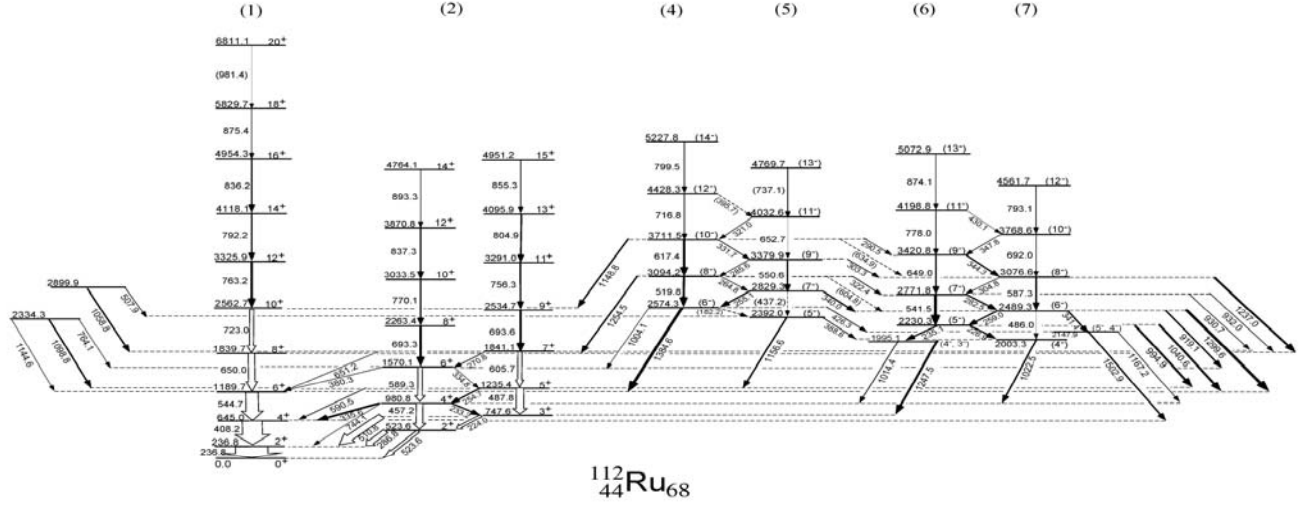


FIG. 1: New level scheme of ^{112}Ru proposed in the present work. Band 4, 5 & 6, 7 comprise the chiral bands.

The theory of chiral doubling in rotational bands of triaxial nuclei developed by Frauendorf and associates has originated an interesting topic in the studies of nuclear structure [1]. Following the experimental evidences of chiral doubling observed in ^{134}Pr [2], ^{136}Nd [3], ^{104}Rh [4] and ^{105}Rh [5] our collaboration proposed chiral degenerate doublet in ^{100}Zr [6] and soft chiral vibration in ^{110}Ru [7] and ^{106}Mo [7].

New level scheme of ^{112}Ru (see Fig. 1) is established in this work based on the measurements of prompt gamma rays from the fission of ^{252}Cf at Gammasphere. A less-compressed Radware cube was used in the data analysis.

The yrast band (band 1) of ^{112}Ru reported in [8] is extended by one level, and the γ band (band 2) is considerably extended from 2534.2 keV (9^+) up to 4951.2 keV (15^+) level. Four new side-bands, band 4, 5, 6, and 7, are identified in this work, all with large branching ratios $I(E2)/I(M1(+E2))$.

The bands 4, 5, 6 and 7 of ^{112}Ru form a doubling of rotational bands, each spin-parity combination occurring twice. The excitation energy difference (ΔE) between the partner levels with the same spin-parity is small and decreases with increasing spin, passing the $\Delta E = 0$ line and then becoming negative, very similar to the trends of the reported chiral bands in ^{134}Pr , ^{104}Rh and ^{105}Rh (see Fig. 2). The branching ratios $I(E2)/I(M1(+E2))$ of the partner bands are found to be equal to each other within the error limits. The newly identified bands 4, 5, 6 and 7 of ^{112}Ru are thus proposed to be chiral rotational doublet bands over the mid-spin range, analogous to ^{134}Pr .

Further analysis and theoretical model calculations are under way.

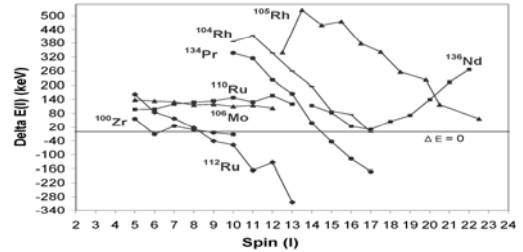


FIG. 2: Energy differences of the doubling partners in ^{112}Ru and of all the chiral partners reported. The ΔE is in keV.

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